

## STUDIES IN AUSTRALIAN EMBIOPTERA.

## PART VII. NEW EMBIOPTERA FROM TROPICAL AUSTRALIA.

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(Fourteen Text-figures.)

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## Family OLIGOTOMIDAE Enderlein 1909.

*Zool. Anz.*, 35: 190.

## Genus OLIGOTOMA Westwood 1837.

*Trans. Linn. Soc. Lond., Zool.*, 17: 373 (as subgenus of *Embia* Latreille. Raised to generic rank, Burmeister, 1839, *Handbuch der Entomologie*, 2: 770). Genotype: *Oligotoma saundersii* Westwood 1837, l.c.

## OLIGOTOMA GURNEYI Froggatt 1904.

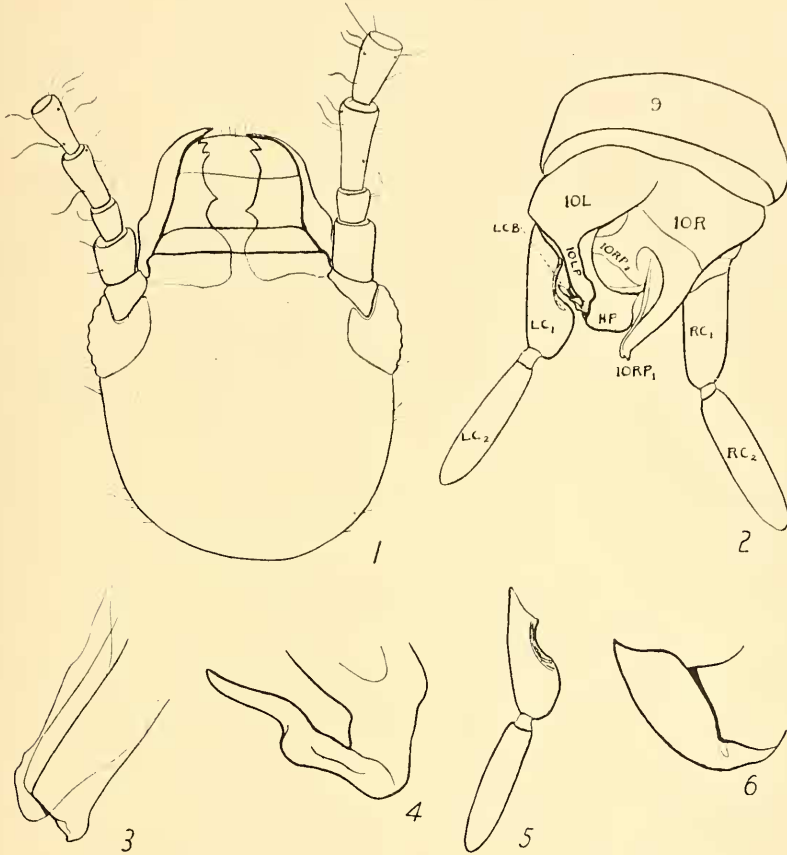
PROC. LINN. SOC. N.S.W., 29: 672; Davis, 1936, *ibid.*, 61: 231. Figs. 1, 11, 18, 25, 32.

## OLIGOTOMA GURNEYI REMOTA, n. subsp. Figs. 1-6.

♂. Length 5.3 mm.; head 1.0 mm. × 0.6 mm.; forewing 3.2 mm. × 0.6 mm.; hindwing 2.6 mm. × 0.6 mm. Colour: Head dark brown, eyes black, body sclerites golden-brown, wings with  $R_1$  and  $Cu_1$  (and its continuation  $Cu_{1b}$ ) golden-brown, all veins or traces of veins bordered by pale brown bands. Head (Fig. 1) almost semi-circular in outline behind the eyes, which are not prominent. Antennae incomplete (length 2.0 mm. for 10 segments), sensory hairs sparse, fine, relatively long, undulant. Mandibles with medial concavity of inner face less defined than in type subspecies. Thorax normal; wings with distribution of veins or traces of veins as throughout the genus, only  $Sc$ ,  $R_1$ ,  $Cu_1$  (and its continuation  $Cu_{1b}$ ) and 1A definite,  $R_s$  (and its continuation  $R_{2+3}$ ) weak, remaining veins represented merely by bordering pigment-bands and, in the forewing, by rows of macrotrichia; even the latter are absent in the hindwings. No cross-veins present. Hind tarsi normal for the genus, i.e., without medial ventral basitarsal bladder. Terminalia (Figs. 2-6) agreeing in general plan with the type subspecies. Posterior process of right hemitergite ( $10RP_1$ ) terminally bifid, the outer tooth being in the form of a small, obtuse, slightly curved dorsal hook (Fig. 3). Inner process of right hemitergite ( $10RP_2$ ) rather broad and irregular. Process of left hemitergite ( $10LP$ ) distinctive, basally rather irregular, distally suddenly narrowed and curved downwards and to the left through about  $135^\circ$  to form a strongly-chitinized hook (Fig. 4), irregularly tapered, terminally sinuous and acute. First segment of left cercus ( $LC_1$ ) with a prominent smooth swelling occupying most of the distal half of the inner face; basad to this the inner face is hardened, flattened in the vertical plane, devoid of setae, and slightly excavate (Fig. 5). Left cercus-basipodite (LCB) fused to left side of hypandrium, free distal end curved and folded upwards and slightly forwards, projecting to the left to engage the hardened basal part of the inner face of the left cercus, and terminally subacute (Fig. 6). Process of hypandrium (HP) terminally slightly expanded as a smooth tongue-like plate.

♀. Length 5.9 mm.; head 0.9 mm. × 0.6 mm. Colour pale brown (? not fully melanized after ecdysis), eyes black, head with slightly darker symmetrical tracery.

*Locality*.—Barred Creek Well, about 20 miles north of Broome, north-west Australia, 20.vii.43, collected by the author in web among fallen leaves and bark against the bases of white-gums, in the Pindan formation. Holotype ♂, allotype ♀, the only specimens secured, Macleay Museum, University of Sydney.



Figs. 1-6.—*Oligotoma gurneyi remota*, n. subsp., holotype ♂. 1. Head from above,  $\times 60$ , outline of mandibles shown. 2. Terminalia from above,  $\times 60$ . 3. Outer process of right hemitergite from above,  $\times 355$ . 4. End of process of left hemitergite from above,  $\times 355$ . 5. Left cercus from above and to the right,  $\times 60$ . 6. Free end of left cercus-basipodite from above,  $\times 355$ .

All figures based on camera lucida outlines. Setae omitted except in Fig. 1.

9, ninth abdominal tergite; 10L, 10R, left and right hemitergites of tenth abdominal segment; 10RP<sub>1</sub>, 10RP<sub>2</sub>, outer (posterior) and inner processes of 10R respectively; 10LP, process of 10L; LC<sub>1</sub>, LC<sub>2</sub>, RC<sub>1</sub>, RC<sub>2</sub>, first and second segments of left and right cerci respectively; LC, one-segmented left cercus; LCB, left cercus-basipodite; H, hypandrium; HP, process of H.

The adults of both sexes are the smallest *Oligotomidae* known from Australia. Structurally, the male is furthest removed of all subspecies of *O. gurneyi*; comparison with the males of other subspecies is summarized in Table 1.

The structure and distribution of these representatives of *O. gurneyi* have been discussed earlier (Davis, 1936, pp. 231-241; 1938, pp. 252-254; 1940, pp. 158-160, and Map 1; 1943). Geographically, the closest record is that from Lalla Rookh Station, some 300 miles south-west of the type locality of *O. gurneyi remota*; the unnamed variant from this locality also occurs at Hermannsburg, some 800 miles south-east of Broome, while Daly Waters, type locality of *O. gurneyi subclavata*, is some 700 miles east of the type locality of *O. gurneyi remota*. No males have yet been secured from any intermediate points. One female and two larvae, unidentifiable, but with tarsi as

TABLE I.  
*Variation in the Subspecies (Geographic Races) of Oligotoma gurneyi Frogg.*

Subspecies.	Range.	Size.	10RP.	10LP.	LC.	LCB.	HP.
<i>gurneyi</i> . . . . .	N.S.W. (Sydney-Nyngan) to eastern Victoria and Tasmania.	Small to rather large.	Termination tapered.	Hook normal.	Subterminal angular inward projection.	End tapered, sub-obtuse.	Tapered.
<i>gurneyi-centralis</i> . . . . .	Western Victoria (Lady Julia Percy I.) to south-eastern parts of South Australia (Lucindale-Adelaide).	Medium to rather large.	" "	" "	" "	End flat, rounded, upcurved.	" "
<i>centralis</i> . . . . .	Central Australia (Alice Springs - Macdonnell Ranges).	Rather large.	Termination bidentate.	" "	Prominent inward protuberance one-third length from end.	" "	" "
<i>gurneyi-centralis-subclavata</i> .	South Queensland (Chinchilla).	" "	" "	" "	Subterminal angular inward projection.	End tapered, sub-obtuse.	" "
<i>subclavata</i> . . . . .	North Australia (Anthony's Lagoons-Daly Waters).	Small.	" "	" "	Slight smooth dilatation in distal third.	End flat, rounded, upcurved.	" "
<i>subclavata-centralis-spinulosa</i> .	Central Australia (Hermannsburg) to north-west Australia (Lalla Rookh, near Port Headland).	Rather large.	" "	Hook rather slender.	Very slight smooth dilatation in distal half.	End flat, obtuse, upcurved.	" "
<i>spinulosa</i> . . . . .	Western Australia latitudes 28° S. to 50° S. (Morgan's-Lake Violet-Annean-Belele-Geraldton).	Medium to large.	" "	Hook slender, sinuous.	Strong angular terminal inward projection.	End acute, spinulose, directed outwards.	" "
<i>remota</i> . . . . .	Far north-west Australia.	Very small.	" "	Hook strong, irregularly tapered.	Strong but smooth inward dilatation occupying distal half.	End flat, upcurved, directed to left, subacute.	Terminally slightly expanded, linguiform.

for the genus *Oligotoma*, were secured some 120 miles east of Broome (Duraban Pool, Fitzroy River, near Mt. Anderson, 27.vi.43: under decaying logs on open river flats, *Bauhinia Cunninghamii* Association), the size and colour of the female (length 14.2 mm.; head 1.9 mm.  $\times$  1.5 mm.; colour of sclerites dark red-brown, slightly paler ventrally) suggesting that it is not very closely related to *O. gurneyi remota*. A further 120 miles to the east, in a similar situation on the banks of the Margaret River at Fossil Downs, characteristic web was found (20.vi.43), the insects apparently having been killed or forced to migrate elsewhere by the dry season. Generally speaking, members of the Order are very rare in the north-west and Kimberley districts of Western Australia.

Family NOTOLIGOTOMIDAE Davis 1940.

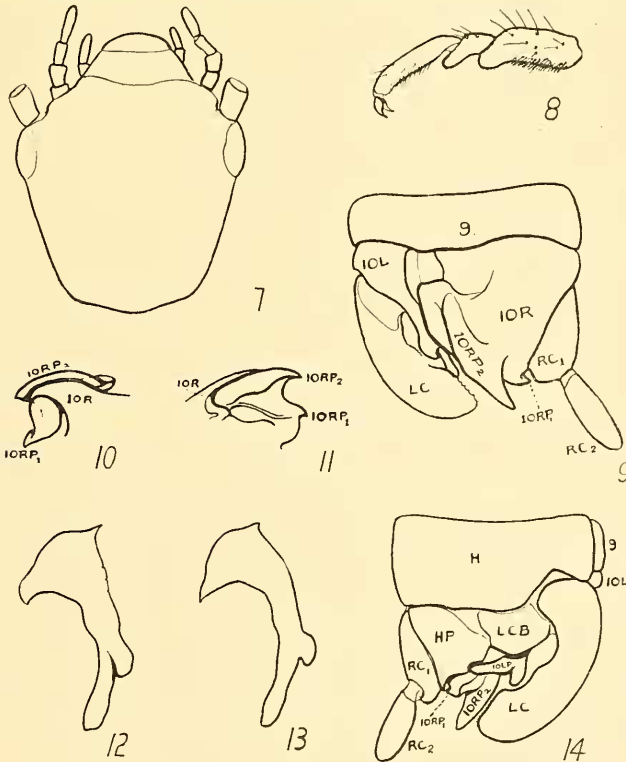
*Ann. Ent. Soc. Amer.*, 33 (4): 681.

Genus METOLIGOTOMA Davis 1936.

*Proc. Linn. Soc. N.S.W.*, 61: 248. Genotype: *Metoligotoma reducta* Davis 1936, l.c.

METOLIGOTOMA NODOSA, n. sp. Figs. 7-14.

♂. Length 6.5-11.5 mm.; head 1.5-2.3 mm.  $\times$  1.1-1.7 mm. Colour: Dorsally black, shiny, with faint bronze sheen (alcoholic specimen under binocular; dull black in life to the naked eye); ventrally dark brown, anterior abdominal sternites paler medially. Segments of legs dark brown, of antennae golden-brown. Inter-segmental membranes



Figs. 7-14.—*Metoligotoma nodosa*, n. sp., ♂ (Figs. 7-9 and 14 from the holotype, remainder from paratypes). 7. Head from above,  $\times$  19. 8. Hind tarsus, lateral view,  $\times$  28. 9. Terminalia from above,  $\times$  28. 10. Processes of right hemitergite of tenth abdominal segment; hemitergite separated from rest of terminalia and viewed from the right,  $\times$  22. 11. The same, from the left,  $\times$  22. 12. Left hemitergite of tenth abdominal segment from above,  $\times$  28. 13. The same, from above and to the left,  $\times$  28. 14. Terminalia from below and slightly to the left,  $\times$  28.

All figures based on camera lucida outlines. Setae omitted except in Fig. 8. For explanation of lettering see below Figs. 1-6.

cream. Head (Fig. 7) with sides straight, strongly converging from eyes to posterior limit. Antennae up to 4.1 mm. long, with up to 20 segments; small specimens with apparently complete antennae of 18 segments, length 2.7 mm. Hind tarsi with a vesicle at the distal end of the plantar surface of the first segment, remainder of surface covered with stiff setae (Fig. 8). In this respect, the species, together with *M. rileyi* Davis (1940, p. 155), differs from all others in the genus. Terminalia (Figs. 9-14) agreeing in general plan with other species of the genus; right hemitergite with its posterior and inner processes (10RP<sub>1</sub>, 10RP<sub>2</sub>; Figs. 10, 11) formed so that there is a distal concavity between them, into which the indrawn left cercus fits; the posterior process is short, thick, irregularly tapered, directed downwards, and terminally subacute, while the inner process is produced backwards to a smoothly-tapered process, subacute in lateral aspect. Antero-medial extension of 10RP<sub>2</sub> pale, membranous, subrectangular. Process of left hemitergite (10LP; Figs. 12-13) long, finger-like, terminally curved down to rest against distal edge of left cercus-basipodite; at half its length, 10LP gives off a rounded nodule, soft but fully melanized, and directed upwards and backwards. The indrawn left cercus fits into the angle between this nodule and the main process. Left cercus (LC) one-segmented, outer margin strongly convex, almost semi-circular, inner margin medially excavate, distally formed into a straight echinulate edge; medial concavity of inner face of cercus with a very slight, faintly echinulate swelling. Left cercus-basipodite (LCB) a large plate, its distal (free) margin barely convex, without process. Process of hypandrium (HP) terminally elongate-tapered, curved upwards beside base of first segment of right cercus. Fifteen males examined.

♀. Length 13.1-15.3 mm.; head 1.7-1.9 mm. × 1.4-1.5 mm. Colour: Head and pronotum orange-brown with chocolate markings; remaining tergites chocolate-brown with paler flecks; abdominal pleurites and sternites pale brown, abdominal sternites, except viii-x, merging to cream at centre. Segments of legs and antennae pale chocolate-brown; inter-segmental membranes cream. Antennae up to 3.0 mm., with 18 segments. Tarsi as in the male. Six females examined.

*Locality*.—Ravenshoe-Mt. Garnett Road, 10 miles from Ravenshoe, N. Queensland, on rocky slopes overlooking The Millstream, among dead leaves (especially of *Pipturus argenteus* Wedd.) in low-grade rain-forest; collected by the author, 20.iii.43, immature, males maturing in culture, April-May, females March-September. Holotype ♂ and allotype ♀, Macleay Museum, University of Sydney.

This species agrees with the only other member of the genus recorded from North Queensland (*M. rileyi* Davis, from Townsville) in the exceptional tarsal structure, but differs considerably from it in details of the terminalia, only the right hemitergite showing any close similarity. *M. nodosa* differs from all other members of the genus (for that matter, all members of the Order) in possessing a smooth, approximately spherical nodule as lateral lobe of the process of the left hemitergite, 10LP.

#### *List of References.*

- DAVIS, C., 1936.—Studies in Australian Embioptera, I. PROC. LINN. SOC. N.S.W., 61: 229-253.  
 ———, 1938.—Id., iii. Ibid., 63: 226-272.  
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